(19) Europäisches Patentamt
Europ an Patent Office
Office europ´en des brevets

(11) Publication number: **0 427 517 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90312146.5**

(51) Int. Cl.[5]: **C02F 1/76**, A01N 59/00

(22) Date of filing: **06.11.90**

(30) Priority: **06.11.89 US 431824**
15.10.90 US 596462

(43) Date of publication of application:
15.05.91 Bulletin 91/20

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL SE

(71) Applicant: **BIO-LAB, INC**
PO Box 1489
Decatur, Georgia 30071-1489(US)

(72) Inventor: **Jones, Ronald L.**
5192 Edgemoor Drive
Norcross, Georgia 30071(US)

(74) Representative: **Lawrence, Malcolm Graham et al**
Hepworth, Lawrence, Bryer & Bizley, 36 Regent Place
Rugby, Warwickshire CV21 2PN(GB)

(54) N-halogen oxidizer composition and N-halogen oxidizer containing a stable blue pigment.

(57) A disinfectant composition comprises trichloro-s-triazinetriane and potassium bromide. A blue pigmented oxidizer composition comprises:-

(a) from 99.5-99.99% by weight of one of the following:-
(i) 1,3 dichloro-5,5-dimethylhydantoin;
(ii) a mixture of the 1-Bromo-3-chloro 5,5-dimethylhydantoin and 1,3-dichloro 5,5-dimethylhydantoin and 1,3-dichloro-5, ethyl-5-methylhydantoin;
(iii) trichloro-s-triazinetrione;
(iv) sodium dichloro-s-triazinetrione;
(v) a mixture of trichloro-s-triazinetrione and sodium bromide;
(iv) a mixture of sodium dichloro-s-triazinetrione and sodium bromide;
(vii) 1-bromo-3-chloro-5,5-dimethylhydantoin;
(viii) a mixture of 1,3-dichloro-5,5-dimethylhydantoin and potassium bromide;
(ix) calcium hypochorite;
(x) lithium hypochlororite; and
(xi) a mixture of trichloro-s-triazinetrione and potassium bromide; and

(b) and from 0.01-.5% by weight of lazurite.

EP 0 427 517 A1

N-HALOGEN OXIDIZER COMPOSITION AND N-HALOGEN OXIDIZER CONTAINING A STABLE BLUE PIGMENT

The invention relates to a compostion that provides hypobromous acid for disinfecting water systems such as swimming pools, spas, decorative fountains, recirculating water cooling systems and health related baths. The invention relates also to adding a stable blue pigment to dry oxidizer compounds for disinfecting water systems such as swimming pools, spas, decorative fountains and recirculating water cooling systems.

A number of different compositions and methods that provide hypobromous acid for disinfecting water systems have been utilized. These technologies curently in use have some serious deficiencies. One of these technologies is a two part system utilizing two products. The first product is a bromide salt solution. The second product is an oxidizing agent containig potassium peroxymonosulfate. This technology is not very efficient and is difficult to use. The chemical must be hand fed. The need to provide a composition which overcomes these disadvantages has existed for some years.

Other technologies include blended compositions containing trichloro-s-triazinetrione (TCCA) and sodium bromide. These blends are normally pressed into a solid composition such as a stick, tablet or puck and are placed in an erosion feeder, skimmer, or floating slow release device. An example of this type is a blend containing 96% TCCA, 2% Sodium Bromide and 2% inert.

It is preferred to use the disinfectant in an erosion feeder, skimmer or a floating release device in order to slowly release the disinfectant into the water system in most applications. The sodium bromide and TCCA are compressed into either a stick, tablet or puck and used in one of the release feeder devices. However, these sticks, tablets or pucks do not maintain their integrity as water is circulated through the release device. Consequently the disinfectant splits, cracks, and breaks into small pieces. These small pieces expose more surface area and an increased rate of erosion occurs. The disinfectant is released too rapidly and is not satisfactory for the treatment of most water systems.

There are several commercial blends of sodium bromide and trichloro-s-triazinetrione available as disinfectants. There are also commercial products which use sodium bromide as the only active ingredient.

US Patent 4,557,926 (Nelson et al) discloses a combination of an alkali metal salt of dichloroisocyanuic acid and either sodium bromide or potassium bromide for use in disinfecting toilets. The use of a bromide salt to bleach and disinfect is disclosed in US Patents 3,519,569 (Diaz), 3,575,865 (Burke et al) , 3,580,833 (Koceich et al), 4,235,599 (Davis et al), 4,382,799 (Davis et al) and 4,600,406 (Corte).

In greater detail, bromo-hydantoins are disclosed in US Patent No 3,575,865 (Burke et al) for use as an oxidizing agent in a bleaching composition. N-bromo-N-chloro-hydantoins compounds are disclosed as being useful as a bleach activator in US Patent No 3, 850,833 (Koceich et al). This cleanser composition consists of a bleach activator, pigment extender, pigment and a particulate carrier. The bleach activator can be an alkali metal bromide. Various glycols are used for the pigment extender and binder. This patent mentions that pigments in the blue through green range may be used. However, only the phthalocyanin pigments, such as chromophthal green are disclosed. These compositions are prepared by mixing a particulate carrier with a bleach activator. The pigment is then added and a pigment extender then mixed with it. US Patent No 3,519,569 (Diaz) discloses an abrasive scouring cleanser containing a bypochlorite liberating compound with an abrasive material, organic detergent and an alkali metal bromide. The hydantoins are included in the class of hypochlorite-generating components. Other hypochlorite-generating compounds are the alkali metal hypochlorite, such as lithium and sodium hypochlorite. US Patent No 4,235,599 (Davis et al) discloses a bleaching composition consisting of a mixture of N, N-dichloro-substituted hydantoin compounds with sodium bromide. The use of N-brominated-hydantoin as bleaching agents is disclosed in US Patent No 4,382,799 (Davis et al). US Patent No 4,600,406 (Corte) discloses a process of bleaching using sodium bromide and sodium hypochlorite. Corte discloses the use of the chloro-hydantoins in his bleaching method.

There are in conclusion a number of oxidizing compounds that are satisfactory for disinfecting water systems. It would be desirable to be able to incorporate a blue pigment in these compounds so that they could be identified as a disinfectant. It would be necessary for the pigment to be stable when incorporated in dry form with th compound. As these oxidizer compounds are used for disinfecting other systems such as swimming pools and spas, it is preferred that the pigment not be stable in the water system. Otherwise it might stain the walls of the swimming pool and spa even though it is used in very small amounts.

It is an object of the present invention in one of its aspects to provide a solid composition that provides hypobromous acid for use in a slow release devic for disinfecting water system which would disslove at a relatively slow rate so that the disinfectant will be released uniformly into the water system over an extended period of tim .

These objects have been obtained by developing a solid disinfectant comprising from 80-99% trichloro-s-triazinetrione (TCCA) and from 1-20% of potassuim bromide (KBr). These two disinfectants ar mixed together and compressed into solid forms such as a tablet, stick or puck. The disinfectant can then be placed in a release device through which water circulates to disinfect a water system such as a swimming pool or cooling tower.

The disinfectant of this invention dissolves at a slower rate in release devices than comparable compositions of sodium bromide and TCCA. Consequently the disinfectant of this invention adds disinfectant to a water system at a controlled and uniform rate over a long period of time.

It is a further object of this invention in a second aspect to add an oxidizer stable dye or pigment to a slowly dissolving solid disinfectant so that it can be distinguished from solid disinfectants that would otherwise be similar in appearance. A further object of this invention is for the dye or pigment to decompose in the water system so that the water is not colored by the dye. This would be objectional to users of the water system in many cases, particularly in the case of swimming pools, as it would stain the walls and bottom surfaces of the pool.

It is accordingly an object of this aspect of the present invention to provide a blue pigment for conventional oxidizer compounds used for disinfecting water systems such as swimming pools and spas so that the compound can be identified as a disinfectant when it is in its dry form. It is a further object of this invention to provide a blue pigment that is not stable in the water system so that it does not stain the walls of swimming pools and spas. This has been achieved with certain oxidizers.

It has been found according to a further aspect of the invention that the pigment lazurite can be added to the composition to color the solid disinfectant. This pigment is oxidizer stable and consequently does not decompose when added to the solid disinfectant, but is decomposed by certain oxidizers in the water system so that the pigment will not color the water or stain hard surfaces such as swimming pool and spa walls. This pigment is added in an amount .01-.5%. The amount of KBr or TCCA is accordingly reduced.

In one aspect, the invention accordingly provides a solid disinfectant that dissolves at a slow and relatively uniform rate when placed in a release device in a water system. The disinfectant is composed of from 80-99% trichloro-s-triazinetrione (TCCA) and from 1-20% potassuim bromide. These two compounds are in solid form and can be mixed together and pressed into a stick, tablet or puck which is suitable for use in various types of release device such as erosion feeders, skimmers or floating release devices. Water circulates through the release device and gradually erodes the solid composition releasing hypobromous acid to serve as the disinfectant in the water system. It is preferred that from 90-97% TCCA be used and from 3-10% potassium bromide (KBr) be used in the composition.

Commercial solid formulations of sodium bromide and TCCA are known. The problem with these formulations is that they dissolve too rapidly in release devices as illustrated in the examples that follow. However, the combination of potassium bromide and TCCA dissolve at a much lower rate.

The solid disinfectant of this invention is useful in disinfecting water systems such as swimming pools, spas, hot tubs and cooling towers. Its composition is normally pressed into tablets, sticks or pucks and placed in a release device such as an erosion feeder, skimmer, in-line halogenator or floating release device in the system.

The invention further provides a blue pigment for a number of conventional oxidizers used to disinfect water systems, with the pigment being stable in the dry form. When certain oxidizers are added to a water system, the pigment decomposes so that the water is not colored which would result in staining the walls of swimming pools and spas.

The following conventional oxidizers were utilized in treating water systems: 1,3 dichloro-5,5- dimethylhydantoin; a mixture of the 1-bromo-3-chloro 5,5-dimethylhydantoin and 1,3-dichloro 5,5-dimethylhydantoin and 1,3 dichloro-5, ethyl-5-methylhydantoin; trichloro-s-triazinetrione; sodium dichloro-s-triazinetrione; a mixture of trichloro-s-triazinetrione and sodium bromide; a mixture of sodium dichloro-s-triazinetrione and sodium bromide; 1-bromo-3-chloro-5,5-dimethylhydantoin; a mixture of 1,3-dichloro-5,5-dimethylhydantoin and potassium bromide, calcium hypochlorite and lithium hypochlorite.

A chlorine stable pigment has been found which is stable in dry form with the above oxidizers. This pigment is ultramarine blue or lazurite, commonly sold under the trade name Pylam Pylaklor Dry Blue™ S-726 (Pigment Blue 29; CI 77007). It has the following composition [(Na, Ca)$_4$ (AlSiO$_4$)$_3$ (SO$_4$, S, C1)] or [Ca_2Na_6 ($Al_6(Sio_4)_6SO_4$ S] or [Na_5 ($Al_3(Sio_4)_3$S] or [Na_5 ($Al_3(Sio_4)_3$ S) (C1). This pigment is blue, blue-violet or greenish-blue in color. Lazurite is oxidizer stable so that the solid composition is blue in color. Lazurite is decomposed by the oxidizer in th water systems when used in certain oxidizers as illustrated in Table 4. All of the oxidizers except mixture 4 and 6 in Table 4 decompose in water systems. Decomposition of the pigment in the water system is preferred because otherwise the pigment may result in a slight blue tint in th water. This is important for some applications as pigment might be objectionable to users of certain

water systems such as swimming pools.

The lazurite is added to the oxidizing compound in an amount of from 0.01-.5% by weight. It is preferred that it be present in an amount of 0.05%-0.25% by weight. One of the pr ferred compositions includes the trichloro-s-triazinetrione in an amount from 90-97% by weight and potassium bromide in an amount from 2.99%-9.5% by weight and lazurite in an amount from .01-.5% by weight.

The lazurite is added to the oxidizer by simple mixing. The oxidizer and pigment can be in granular or a pressed composition.

The lazurite pigment gives a distinctive blue color to the white oxidizer compound which is stable for a long period of time. However when the pigmented oxidizer is introduced into the water system, the pigment becomes unstable with certain oxidizers so the water is not colored blue. This is preferred to avoid staining the walls of swimming pools and spas.

It is also possible for the formulation in accordance with either aspect of the invention to include a filler. The filler is an inert substance, such as sodium chloride or boric acid, that can be used to assist in the tablettability as a composition. A filler can be used in any concentration provided the compostion contains the required amount of the disinfectant. The filler is preferably present from 5-10% by weight.

In addition to the components of the disinfectant described above, the formulations may also contain other ingredients, such as tabletting aids, eg, mold release agent, binders, corrosion inhibitors, scale inhibitors and other components known to one skilled in the art. The tablets, sticks or pucks are formed in the usual manner.

Finding a stable blue pigment is important as it clearly identifies the oxidizer as a disinfectant suitable for use in water systems.

It is preferred that the blue pigmented oxidizers and other oxidizer compositions of this invention be compressed into solid form and used in a release device so that the disinfectant is immersed or partially immersed in water within an enclosure in which disinfecting material is gradually eroded and released to disinfect the water system. The composition can be pressed into tablets, sticks or pucks by well-known commercial devices.

The following specific Examples are intended to illustrate the invention by way of example only:-

Example 1

The oxidizers set forth in Table 1 were each mixed with lazurite until a uniform blue mixture was obtained. The oxidizer was mixed in an amount of 99.8% by weight with 0.20% lazurite. After mixing thes compositions were stored using a 35 day accelerated stability testing method. Compositions were stored at 50°C. The stability of the blue pigment in the composition was observed visually. The following results were obtained for each of the oxidizers:

Table 1

OXIDIZER		Today	35 days later	Stability of Pigment
1.	1,3-dichloro-5, 5-dimethylhydantoin	Blue	Blue	Stable
2.	a mixture of 60% by weight of the 1-bromo-3-chloro-5, 5-dimethylhydantoin and 27.4% weight of the 1,3-dichloro-5,5-dimethyl-hydantoin and 10.6% of the 1,3-dichloro-5, ethyl-5-methylhydantoin and 2.0% inert substances.	Blue	Blue	Stable
3.	trichloro-s-triazine-trione (TCCA)	Blue	Blue	Stable
4.	sodium dichloro-s-triazinetrione	Blue	Blue	Stable
5.	a mixture of the trichloro-s-triazinetrione of 96% by weight and 4% by weight of sodium bromide	Blue	Blue	Stable
6.	a mixture of 85% by weight of sodium dichloro-s-triazine-trione and 15% by weight of sodium bromide	Blue	Blue	Stable
7.	1-Bromo-3-chloro 5, 5-dimethyldantoin	Blue	Blue	Stable
8.	a mixture of 96% by weight of 1,3-dichloro 5,5-dimethylhydantoin and 4% by weight of potassium bromide	Blue	Blue	Stable
9.	calcium hypochlorite	Blue	Blue	Stable
10.	lithium hypochlorite	Blue	Blue	Stable

Example 2

The stability of the lazurite pigment in each of the disinfecting compositions set forth in Example 1 was tested by placing 0.5 gm of each composition in 1,000 gm of distilled water. An additional 0.1 gm of lazurite pigment was added to the water for visual effect. The disinfectant composition was allowed to mix in the

water for a 24 hour period. The results of the test are set forth in Table 2. The oxidizer numbers used in Table 1 ar used here for reference.

Table 2

OXIDIZER	Pigment Color Time of Mixing	Pigment color 1.5 hrs later	Pigment Color 24 hrs later
1.	Blue	Blue	Colorless
2.	Blue	Blue	Colorless
3.	Blue	Colorless	Colorless
4.	Blue	Blue	Blue
5.	Blue	Colorless	Colorless
6.	Blue	Blue	Blue
7.	Blue	Blue	Colorless
8.	Blue	Blue	Colorless
9.	Blue	Colorless	Colorless
10.	Blue	Colorless	Colorless

Example 3

Tablets of disinfectant for this test were prepared by mixing the ingredients and pressing in a conventional tablet machine to form tablets one inch in diameter. Sticks were prepared by mixing the ingredients and forming under pressure in a conventional stick-forming machine to form one-half pound sticks.

Trichloro-s-triazinetrione in an amount of 96% parts by weight was mixed with sodium bromide in an amount of 4% parts by weight and formed into sticks and tablets. A second disinfecting composition was prepared composed of 96% parts by weight trichloro-s-triazinetrione and 4% potassium bromide and formed into sticks and tablets.

These two compositions were compared by placing them in a commercially available erosion control device through which water was circulated at a controlled rate of gallons per hour (gph). Water temperature was maintained at 80-81°F. Total alkalinity of the water was controlled at 100 parts per million. The calium hardness was at 200-300 parts per million. The pH was at 7.4 to 7.6. Tablets or sticks were put in a release device and allowed to operate until the output had stabilized. The following table shows the results.

Table 3

Flow Rate (GPH)	1" tablets 9 6 % T.C.C.A. 4% KBr lbs Cl_2 per 8 hours	1" tablets 9 6 % T.C.C.A. 4% KBr lbs Br_2 per 8 hours	0.5 lb stick 9 6 % T.C.C.A. 4% KBr lbs Cl_2 per 8 hours	0.5 lb stick 9 6 % T.C.C.A. 4% KBr lbs Br_2 per 8 hours
10	0.96	(2.2)	0.35	(0.79)
20	1.2	(2.8)	0.46	(1.0)
30	1.6	(3.6)	0.52	(1.2)
40	1.9	(4.2)	0.59	(1.3)
50	2.2	(4.9)	0.69	(1.6)

Table 4

Flow Rate (GPH)	1" tablet 9 6 % T.C.C.A. 4% NaBr lbs Cl_2 per 8 hours	1" tablet 9 6 % T.C.C.A. 4% NaBr lbs Br_2 per 8 hours	0.5 lb stick 9 6 % T.C.C.A. 4% NaBr lbs Cl_2 per 8 hours	0.5 lb stick 9 6 % T.C.C.A. 4% NaBr lbs Br_2 per 8 hours
10	1.1	(2.5)	0.14	(1.0)
20	1.5	(3.3)	0.58	(1.3)
30	1.8	(4.0)	0.67	(1.5)
40	2.1	(4.8)	0.80	(1.8)
50	2.5	(5.7)	0.90	(2.0)

In comparing the 1" tablet with KBr with those with NaBr, it will be noticed the pounds of chlorine released in an eight hour period are significantly less with the KBr than with the NaBr formulations. For example at a flow rate of 20 gallons per minute, the output rate of the formulation with the KBr is approximately 20% less than with NaBr. At 50 gallons per minute, the release of chlorine for eight hours is approximately 12% less with the KBr than with the NaBr. In comparing the sticks, it will be noticed that the release rate for the chlorine for eight hours is significantly less for the KBr formulation than for the NaBr formulation. For example at a flow rate of 40 gallons per hour, the output of chlorine for eight hours is approximately 26% less for the KBr than for the NaBr.

The bromine output for eight hours is also significantly less for sticks and tablets formed with KBr than those formed with NaBr. For example at a flow rate of 20 gallons per minute, the bromine output rate for the tablets formed with KBr was approximately 15% less than with the NaBr. The bromine output rate for these tablets at a flow rate of 50 gallons per minute was 14% less for the KBr tablets than for the NaBr containing tablets. The output rate was 20% less for the KBr sticks at 30 gallons per minute than for the NaBr sticks.

Example 4

Tablets and sticks of 100% trichloro-s-triazinetrione were prepared in accordance with the procedur of Example 3 and tested in the same manner. The following table shows the results.

Table 5

Flow Rate (GPH)2030	1" tablets 1 0 0 % T.C.C.A. lbs Cl_2 per 8 hours	1" tablets 1 0 0 % T.C.C.A. lbs Br_2 per 8 hours	0.5 lb stick 1 0 0 % T.C.C.A. lbs Cl_2 per 8 hours	0.5 lb stick 1 0 0 % T.C.C.A. lbs Br_2 per 8 hours
10	1.1	(2.5)	0.32	(0.72)
20	1.7	(3.8)	0.40	(0.90)
30	2.0	(4.5)	0.48	(1.1)
40	2.3	(5.2)	0.56	(1.3)
50	2.8	(6.3)	0.64	(1.4)

In comparing the 1" tablet with 96% TCCA and 4% NaBr (Table 3) with 100% TCCA (Table 5), it will be noticed with TCCA alone. For example, at a flow rate of 20 gallons per minute the KBr tablets had a chlorine output rate that was 29% less than of the TCCA tablet alone (Table 4). The KBr sticks (Table 3) at a flow rate of 20 gallons rate per minute had a chlorine output rate that was 13% less than of the TCCA tablets (Table 4). The bromine output rate with a 1" tablet at a flow rate of 40 gallons per minute was 19% less with the KBr tablet (Table 3) than with the TCCA tablets (Table 5).

Example 5

The disinfectant composition was prepared by mixing the following ingredients in accordance with the following formulation: TCCA 95.8%, KBr 4%, Lazurite .2%. These compositions were blended until a uniform blue mixture was obtained. These compositions were stored using a thirty day accelerated stability testing method at 50°C. Compositions remained blue at the conclusion of the test. The stability of the pigment in water containing an oxidizer has measured in accordance with the following procedure; 0.5 gm of the composition was added to 1000 gm of distilled water. An additional 0.1 gm of Lazurite was added for visual effect. These mixtures were allowed to mix over a 24 hour period. The color of the water immediately upon adding the composition was blue, but the water became colorless after 1 1/2 hours and remained so at the end of the 24 hour period.

Claims

1. A blue pigmented dry oxidizer composition comprising a mixture of :-
   (a) from 99.5% to 99.9% by weight of the mixture of a halogen-releasing component, namely one or more of:-
      (i) 1,3-dichloro-5,5-dimethylhydantoin;
      (ii) a mixture of (a) 1-bromo-3-chloro 5,5-dimethylhydantoin, (b) 1,3-dichloro 5,5-dimethylhydantoin and (c) 1,3-dichloro-5-ethyl-5-methylhydantoin;
      (iii) trichloro-s-triazinetrione;
      (iv) sodium dichloro-s-triazinetrione;
      (v) a mixture of trichloro-s-triazinetrione and sodium bromide;
      (vi) a mixture of sodium dichloro-s-triazinetrione and sodium bromide;
      (vii) 1-bromo-3-chloro-5,5-dimethylhydantoin;
      (viii) a mixture of 1,3-dichloro-5,5-dimethylhydantoin and potassium bromide;
      (ix) calcium hypochlorite;
      (x) lithium hypochlorite; and
      (xi) a mixture of trichloro-s-triazinetrione and potassium bromide; and
   (b) from 0.01% to 0.5% by weight of the mixture of lazurite.
2. A composition as claimed in Claim 1 wherein the halogen-releasing component is present in an amount of from 99.75% to 99.95% by weight of the mixture and the lazurite is present in an amount from 0.05% to 0.25% by weight of the mixture.
3. A composition as claimed in Claim 1 or Claim 2 wherein the halogen-releasing component is a mixture of from 40% to 80% by weight of the halogen-releasing component mixture of 1-bromo-3-chloro 5,5-dimethylhydantoin, from 15% to 40% by weight of the halogen-releasing component mixture of 1,3-dichloro 5,5-dimethylhydantoin and from 5% to 15% by weight of the halogen-releasing component mixture of 1,3-dichloro-5-ethyl-5-methylhydantoin.
4. A composition as claimed in Claim 1 or Claim 2 wherein the halogen-releasing component is a mixture of from 90% to 97% by weight of the halogen-releasing component mixture tri-chloro-s-triazinetrione and from 3% to 9.5% by weight of the halogen-releasing component mixture of sodium bromide.
5. A composition as claimed in Claim 1 or Claim 2 wherein the halogen-releasing component is a mixture of from 80% to 90% by weight of th halogen-releasing component mixture of sodium dichloro-s-triazinetrione and from 10% to 15% by weight of the halogen-releasing component mixture of sodium bromide.
6. A composition as claimed in Claim 1 or Claim 2 wherein the halogen-releasing component is a mixture of from 90% to 97% by weight of the halogen-releasing component mixture of 1-dichloro 5,5-dimethylhydantoin and from 3% to 10% by weight of the halogen-releasing component mixture of potassium bromide.
7. A composition as claimed in any preceding claim wherein the mixture of the halogen-releasing

component and the lazurite is compounded with an inert filler present in the composition in an amount of from 5% to 10% by weight of the composition.

8. A solid disinfecting composition for disinfecting water systems and comprising a mixture of trichloro-s-triazinetrione in an amount of from 80% to 99% by weight of the mixture and potassium bromide in an amount of from 1% to 20% by weight of the mixture, said composition providing a prolonged and controlled release of hypobromous acid when immersed in water.

9. A composition as claimed in Claim 8 wherein the trichloro-s-triazinetrione is present in an amount from 90% to 97% by weight of the mixture and the potassium bromide is present in an amount of from 3% to 10% by weight of the mixture.

10. A solid disinfecting composition in which lazurite blue pigment is stable, said composition comprising trichloro-s-triazinetrione together with potassium bromide.

11. A composition as claimed in any one of Claims 8 to 10 and including lazurite in admixture with said trichloro-s-triazinetrione and said potassium bromide.

12. A composition as claimed in any one of Claims 8 to 11 wherein the trichloro-s-triazinetrione is present in an amount from 90-97% by weight and the potassium bromide is present from 3-9.5% by weight and lazurite is present in an amount from 0. 1-.5% by weight.

13. A composition as claimed in any one of Claims 8 to 12 and comprising a mixture of a halogen-releasing component in an amount of from 99.5% to 99.9% of the mixture, said halogen-releasing component comprising trichloro-s-triazinetrione in an amount of from 90% to 97% of the mixture and potassium bromide constituting the balance of said halogen-releasing component, and lazurite in an amount of from 0.1% to 5% by weight of the mixture.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2146

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y,P	WO-A-9 000 006 (PPG INDUSTRIES, INC.) * page 2, line 28 - page 5, line 30 * * page 9, lines 21 - 34 @ page 11, lines 29 - 36 *	1,2,7	C 02 F 1/76 A 01 N 59/00
Y	EP-A-0 206 718 (THE CLOROX COMPANY) * page 2, lines 20 - 30 * * page 7, lines 19 - 28 *	1,2,7	
A	US-A-4 698 165 (T.W.THEYSON) * the whole document *	1,3	
A	US-A-3 401 116 (D.A.STANWOOD) * the whole document *	1,4,5	
A	EP-A-0 005 286 (THE PROCTER & GAMBLE COMPANY) * page 2, lines 18 - 29 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
C 02 F A 01 N

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	11 February 91	GONZALEZ ARIAS M.L.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document